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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,370	02/26/2004	Pei-Ying Lin	ALIP0019USA	2369
27765 7590 09/12/2007 NORTH AMERICA INTELLECTUAL PROPERTY CORPORATION P.O. BOX 506 MERRIFIELD, VA 22116			EXAMINER LEE, GINA W	
			ART UNIT 2609	PAPER NUMBER
			NOTIFICATION DATE 09/12/2007	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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# Office Action Summary

Application No.

10/708,370

Applicant(s)

LIN, PEI-YING

Examiner

Gina W. Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 26 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Specification*

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: "Method for calculating a pitch estimation of speech signals using autocorrelation".

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 2, and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art in view of Lakaniemi et al. (US 6,199,035) and further in view of Meisel et al. (US 5,054,085).
4. With respect to **claims 1, 2 and 4**, the applicant's admitted prior art teaches a method and system for calculating a pitch estimation of a sound signal with a voice processor including the following steps:  
  
using the voice processor to generate a plurality of autocorrelation values (paragraph [0008])  
  
and comparing the plurality of autocorrelation values to find the maximum of the plurality of autocorrelation values and calculating the pitch estimation of the sound signal

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according to the lag parameter corresponding to the maximum autocorrelation values (paragraph [0008]).

However, the applicant's admitted prior art does not teach starting with an initial pitch range according to the signal and corresponding pitch ranges in a database to use for the calculation of a range of lag parameter values on which to perform autocorrelation.

Lakaniemi in the same field of endeavor (pitch-lag estimation) teaches a method including the steps of:

determining a pitch upper bound value and a pitch lower bound value (col. 2, lines 17-19 and Fig 3, col. 2, lines 31-45, the pitch-lag parameter, which describes the fundamental frequency of the speech signal, is limited to a range between delay search limits  $d_L$  and  $d_H$ ) according to the signal (Col. 3, lines 4-10, pitch must be within the neighborhood of the pitch of previous frames, as determined by a predetermined factor)

and setting an increment value equal to the lag parameter lower bound value (col. 2, lines 32-45, the equation shows that the autocorrelation function is determined for values of the lag starting at  $d_L$ , which is incremented until it reaches  $d_H$ ).

Lakaniemi does not teach the final limitation of obtaining the predetermined pitch range from a database. However, the examiner contends that this concept was well known in the art, as taught by Meisel.

Meisel teaches a method and apparatus for speech processing in which information such as pitch settings (col. 11, lines 9-12, user specific pitch settings (103)) is stored (col. 3, lines 47-49). The pitch estimates are provided to another module for further processing (col. 4, lines 45-50).

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify applicant's admitted prior art by providing a predetermined pitch range from the signal as taught by Lakaniemi, and further by providing a pitch range from a database as taught by Meisel, because it was well known in the art at the time of invention that reducing the possible pitch range improves accuracy and reduces processing time (Meisel, col. 2, lines 47-55).

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art in view of Lakaniemi et al. (US 6,199,035) and Meisel et al. (US 5,054,085) as applied to claim 1 above, and further in view of Heikkinen et al. (US 6,915,257).

With respect to **claim 3**, Applicant Admitted Prior Art in view of Lakaniemi and Meisel teaches everything claimed, as applied above (see claim 1), but does not teach an autocorrelation threshold to further limit the pitch range.

In the same field of endeavor, Heikkinen teaches a method including the steps of:  
providing a threshold value (col. 5, line 54, threshold value is some  $C_{tr}$ );  
and comparing the plurality of autocorrelation values and the threshold value (Fig 3, col. 5, lines 47-63, if autocorrelation values are above the threshold, they are classified as voiced).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Applicant Admitted Prior Art in view of Lakaniemi and Meisel by adding a minimum threshold value as taught by Heikkinen, because it was well known in the art at the time of invention that unvoiced sounds have no discernable pitch, and thus it would save processing time to eliminate unvoiced speech from consideration when determining pitch.

***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Su (US 5,781,880) discloses a device and method of pitch estimation using an estimated lag range.

Wu (US 2004/0260537) discloses a method of estimating pitch using an estimated lag range and autocorrelation.

Holzrichter et al. (US 7,162,415) discloses a system for voice coding that codes for gender to correspond to different pitch ranges.

Yoo et al. (US 5,657,419) discloses a method for processing a speech signal using pitch lag and autocorrelation.

McDonough et al. (US 5,727,123) discloses a method and apparatus for implementing a vocoder using the pitch lag.

Nelson et al. (US 6,556,967) discloses a device and method of detecting voice activity based on a pitch range.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gina W. Lee whose telephone number is (571) 270-3139. The examiner can normally be reached on Monday to Thursday, 6:30 AM - 5:00 PM EST.

8. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexander Eisen can be reached on (571) 272-2687. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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9. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Alexander Eisen

SPE

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